

5.4 Undisclosed Mining-Related Sites

Based on information reviewed by Roux Associates, there are 671 undisclosed mining-related sites that were owned and/or operated by Kerr-McGee or were otherwise connected with Kerr-McGee but were not disclosed on Schedule 2.5(a) of the Master Separation Agreement.¹ Three of these sites (North Searles Valley, Panamint Valley, and Searles Lake) were previously discussed in **Section 5.3**, while the remaining 668 sites are discussed in this section. There were no reserves for these sites as of November 2005. Roux Associates, however, has estimated that, as of November 2005, the present value of the cost for necessary and appropriate environmental response actions remaining at these 668 sites, apportioned to Kerr-McGee, based on information that was known or knowable as of November 2005, ranged from \$208.4M to \$223.9M. This range represents the cumulative present value range, apportioned to Kerr-McGee, for the 12 sites for which sufficient site-specific information was identified by Roux Associates in the time available to estimate the present value of the costs for future response actions (or, in the case of CSMRI Table Mountain [**Section 5.4.4**], for both future response actions and past response actions conducted by others seeking reimbursement from Kerr-McGee Corporation). These 12 sites are discussed in **Sections 5.4.1** through **5.4.12**, and their respective present values are shown in the table below. Roux Associates did not estimate the present value of response action costs for the remaining 656 sites, as discussed in **Section 5.4.13**.

Site	Section	Present Value ²
1. Lukachukai	5.4.1	\$148.7M
2. Juniper Mine	5.4.2	\$831K - \$2.4M
3. Flat Top Mine	5.4.3	\$20.8M
4. CSMRI Table Mountain	5.4.4	\$8.7M
5. Griffin Burning Station	5.4.5	\$9.2M
6. Caselton Mine and Mill	5.4.6	\$8.9M - \$15.6M
7. Bristol Mine	5.4.7	\$636K - \$7.9M
8. Mansfield Canyon	5.4.8	\$3.6M
9. Red Mountain, Colorado	5.4.9	\$4.4M
10. Red Mountain, Arizona	5.4.10	\$1.2M
11. Banta Hill	5.4.11	\$973K
12. Pinal County	5.4.12	\$296K

¹ Note, two of these sites (Lukachukai and Pinal County) comprise multiple mining-related sites located over a wide geographic area; however, they are both considered single (consolidated) sites herein.

² The present values when added using unrounded amounts = \$208.4M to \$223.9M rounded to four significant digits.

Identification of Mining-Related Sites Not Disclosed by Kerr-McGee

The undisclosed Kerr-McGee mining-related sites include a variety of properties, such as prospects, exploration sites, mines, mills, and other mineral processing facilities, and involve a variety of commodities including uranium, precious metals, coal, and other commodities. These undisclosed sites were identified during Roux Associates' review of Kerr-McGee records and other sources of information as set forth in the site specific sections below and including the following:

1. Kerr-McGee spreadsheet titled "*KM Minerals Expl List for Chem Due Diligence April 2005*";
2. U.S. Government Proofs of Claim;
3. Schedule 3.8 of the draft "*Disclosure Schedule to Purchase and Sale Agreement Among Kerr-McGee Corporation, Kerr-McGee Worldwide Corporation and Blanco Holdings, Inc.*" (August 2005);
4. Undated Kerr-McGee spreadsheet titled "*Environmental Project Summary List*";
5. Spreadsheet titled "*SUMMARY, Inactive/Potential Environmental Sites/Issues*" (initialed "gdc" and dated March 18, 1993);
6. Report titled "*Radioactive occurrences and uranium production in Arizona*" prepared by R.B. Scarborough, Arizona Bureau of Geology and Mineral Technology (March 1981);
7. Undated Kerr-McGee document titled "*Chronology of Uranium Activities*";
8. Book titled "*Innovations in Energy: The Story of Kerr-McGee*" (Ezell, 1979);
9. Interviews with former AEC employee Bill Chenoweth;
10. USGS Mineral Resource Data System; and
11. Internal Kerr-McGee correspondence.

Most of the undisclosed mining-related sites (617³) were listed in a Kerr-McGee spreadsheet titled "*KM Minerals Expl List for Chem Due Diligence April 2005*" (**Appendix E-2**), which also includes four disclosed mining sites. An additional 54 undisclosed mining-related sites were identified through Roux Associates' review of the other sources of information listed above. All 675 disclosed and undisclosed Kerr-McGee mining-related sites are listed in a table prepared by Roux Associates and also included **Appendix E-2**. The sources indicating a connection of these sites to Kerr-McGee are also indicated in this table. Of these 675 Kerr-McGee mining-related sites, four (Lakeview, Ambrosia Lake, Riley Pass, and Churchrock) were

³ There were actually 621 undisclosed sites listed in the *KM Minerals Expl List for Chem Due Diligence April 2005*; however, in this section, five of the 621 sites (Bloodsucker Wash, Granite Mtn., Kelvin, San Manuel-North, and Three Buttes, all located in Pinal County, Arizona) are discussed together and are considered part of a single site ("Pinal County").

included on Schedule 2.5(a) of the Master Separation Agreement and so were discussed in **Section 4.5**. As mentioned above, three additional sites (Searles Lake, North Searles Valley, and Panamint Valley) were discussed in **Section 5.3**, as they are associated with the American Potash & Chemical Company. Of the remaining 668 undisclosed sites, Roux Associates identified site-specific information adequate to estimate response action costs for only 12 sites in the time available. These sites are discussed in **Sections 5.4.1** through **5.4.12**. The other 656 undisclosed mining-related sites, for which response action costs were not estimated, are discussed together in **Section 5.4.13**.

Mining Regulations/Potential Kerr-McGee Liability for Response Action at Mining Sites

Government regulation of the mining industry dates back to the mid-nineteenth century, with the passage of legislation at the state and, later, federal levels that, in essence, ratified the rules and customs adopted earlier by the miners themselves, first in California and later in other western states and territories. These rules and customs, which related primarily to the staking, maintaining, and forfeiting or abandonment of mining claims on public lands, became part of federal mining law with the passage of an act in 1866 that provided for the free and open exploration and occupation of mineral lands of the public domain and for the patenting⁴ of certain mining claims (i.e., lode claims⁵). The general mining statute of 1866 and a subsequent act passed in 1870 (“the Placer Act,” which provided for the patenting of placer claims⁶) were later combined and improved upon in the 1872 Mining Law, which has served as the primary basis for U.S. “hard-rock” (i.e., metals) mining law ever since.⁷ Mining of fossil fuels (e.g., coal, oil, natural gas) and “soft-rock” minerals such as phosphate and potash, originally also regulated under the Mining Law (as confirmed by Congress in the Oil Placer Act of 1897), has been regulated under the Mineral Leasing Act since its passage in 1920.^{8,9}

Although detailed regulation of the environmental aspects of operations conducted under the Mining Law and the Mineral Leasing Act did not appear until the 1970s, these laws did not preclude the need for environmental regulation. For example, the Mineral Leasing Act gave broad

⁴ With a patented claim, the legal title to the land passes from the federal government to the claimant.

⁵ i.e., for mineral deposits found as veins or rock in-place.

⁶ i.e., for other mineral deposits, such as those found in unconsolidated sand-and-gravel deposits.

⁷ Leshy, J.D., 1987. The Mining Law, a Study in Perpetual Motion. Resources for the Future, Washington, D.C.

⁸ <http://www.enotes.com/major-acts-congress/mineral-leasing-act>

⁹ <http://library.findlaw.com/1999/Jan/1/241491.html>

discretion to the Secretary of the Interior to arrange for “lease terms and conditions...that would assure both conservation and timely development of the minerals.”¹⁰ Similarly, the Mining Law authorized state, territorial, and local regulations not in conflict with federal law and, in fact, some of these early state regulations were directly aimed at controlling adverse environmental impacts.¹¹ For example, one early statute enacted in California required miners on federal land to post a bond to compensate for any damage to crops, fruit trees, or buildings occupied by squatters on the land.¹² State laws were also enacted restricting the impairment of water sources with “poisonous chemicals,” and a federal law was enacted in 1893 that created the California Debris Commission to license and regulate hydraulic mining on rivers (which was ruining downstream farms and orchards).¹³ A series of legal decisions in the 1880s that effectively halted the practice of hydraulic mining addressed the issue of whether the Mining Law somehow insulated hydraulic miners from environmental regulation. In one such case, the Supreme Court of California rejected the argument that the uncontrolled discharge of mining debris was “sanctioned by custom and legislative acquiescence.” In the same vein, a steady stream of later decisions awarded damages to those whose property was impacted by mining operations and occasionally halted the offending practices by injunction.¹⁴ Based on these rulings, it can be concluded that although the Mining Law and the Mineral Leasing Act did not specifically regulate environmental aspects of mining, they did not give miners license to indiscriminately pollute air and water resources or to release hazardous materials into the environment.

Although states occasionally enacted additional legislation focusing on specific aspects of mine operations and their effects on the environment (e.g., Pennsylvania’s Act 375, passed in 1913, prohibiting the discharge of anthracite coal or mine waste into streams¹⁵), comprehensive regulation of mining operations from an environmental standpoint was, for the most part, not instituted at the state or federal level until the 1970s.¹⁶ Even so, most of the “environmental”

¹⁰ Fairfax, S.K. and C.E. Yale, 1987. Federal Lands, A Guide to Planning, Management, and State Revenues. Island Press, Washington, D.C.

¹¹ Leshy, J.D., 1987. The Mining Law, a Study in Perpetual Motion. Resources for the Future, Washington, D.C.

¹² Leshy, J.D., 1987. The Mining Law, a Study in Perpetual Motion. Resources for the Future, Washington, D.C.

¹³ Costigan, G.P., 1908. Handbook on American Mining Law. West Publishing Co., St. Paul Minnesota.

¹⁴ Leshy, J.D., 1987. The Mining Law, a Study in Perpetual Motion. Resources for the Future, Washington, D.C.

¹⁵ http://www.leo.lehigh.edu/envirosci/enviroissue/amd/links/laws1_.html

¹⁶ One exception would be the Surface Mining Conservation and Reclamation Act passed by the Commonwealth of Pennsylvania in 1945 and characterized as “a more comprehensive attempt to regulate surface coal mining” (http://www.leo.lehigh.edu/envirosci/enviroissue/amd/links/laws1_.html).

mining statutes enacted in the 1970s, such as the federal Surface Mining Control and Reclamation Act of 1977 (SMCRA) and California's Surface Mining and Reclamation Act of 1975, were enacted primarily to establish regulations for the permitting and reclamation of new and existing mines rather than to address the legacy effects of past mining operations.¹⁷ Consequently, mines closed or abandoned prior to the 1970s—such as most of the undisclosed Kerr-McGee mine sites—are not subject to SMCRA or similar state statutes and the associated standards for mine closure and reclamation.

The Uranium Mill Tailings Radiation Control Act (UMTRCA), passed by Congress in 1978 following the development of “a [national] appreciation...for the potential health hazards and the severity of environmental disturbances that had accumulated over the long history of domestic uranium ore mining and processing,”¹⁸ was the first statute directly addressing legacy mining impacts on a comprehensive scale. UMTRCA established two programs to protect the public and the environment from uranium mill tailings:¹⁹

1. The UMTRCA Title I program established a joint federal/state-funded program for remedial action at abandoned mill tailings sites where tailings resulted largely from production of uranium for the nation's weapons program. This program involved three federal agencies:
 - (a) The U.S. Department of Energy (DOE) was tasked with cleanup and remediation of these sites;
 - (b) The U.S. Nuclear Regulatory Commission (NRC) was tasked with evaluating DOE's design and implementation and, after remediation, concurring that the sites meet cleanup standards; and
 - (c) The USEPA was charged with setting the cleanup standards for these sites.²⁰

¹⁷ SMCRA did address past mining operations to some extent, in that Title IV of the act provided for the funding of state programs for the reclamation of abandoned mine sites.

¹⁸ U.S. Energy Information Administration, 2005. U.S. Uranium Production Facilities: Operating History and Remediation Cost Under Uranium Mill Tailings Remedial Action Project as of 2000. <http://www.eia.doe.gov/cneaf/nuclear/page/untra/title1map.html>

¹⁹ According to the Dictionary of Geological Terms (Bates and Jackson, eds., 1984. Anchor Press/Doubleday, Garden City, NY), tailings are those portions of washed or milled ore that are regarded as too poor to be treated further, as distinguished from the concentrates, or material of value.

²⁰ U.S. Nuclear Regulatory Commission, 2006. Fact Sheet on Uranium Mill Tailings. <http://www.nrc.gov/reading-rm/doc-collections/fact-sheets/mill-tailings.html>

Title I also authorized the cleanup of “vicinity properties,” nearby properties contaminated by mill tailings either transported from the mill sites by wind and water or at which mill tailings were used as construction material.²¹

2. The UMTRCA Title II program was directed toward uranium mill sites that were licensed by the NRC (or qualified states) as of 1978. Title II of UMTRCA provides for the following:
 - (a) NRC authority to control both radiological and non-radiological hazards at operating mill sites;
 - (b) EPA authority to set standards for both radiological and non-radiological hazards; and
 - (c) Eventual state or federal ownership of the sites, under general license from the NRC.²²

The key difference between Title I and Title II sites is that cleanup of Title I sites is government-funded, while cleanup of Title II sites is funded by the owner or operator of the mill. Specifically, to obtain closure, the owner or operator of a Title II site conducts an NRC-approved reclamation of any on-site radioactive waste remaining from uranium ore-processing operations and ensures full funding for inspections and, if necessary, ongoing maintenance. DOE then accepts title to the site for long-term custody and care under a general NRC license.²³ Some of the costs incurred by the owner/operator in reclaiming Title II mill sites pursuant to UMTRCA are reimbursable under Title X of the Energy Policy Act of 1992.²⁴

The cleanup authorities granted under UMTRCA were limited to uranium milling sites (more specifically, to the mill tailings at those sites and the impacts associated with the tailings) and did not extend to the mines from which the uranium ore was derived.²⁵ In addition, no legislation similar to UMTRCA has been enacted specifically to address legacy effects associated with other types of mining and/or milling operations. Rather, the primary legal basis for addressing legacy effects associated with abandoned mines and non-uranium mill sites is the federal

²¹ U.S. Energy Information Administration, 2005. U.S. Uranium Production Facilities: Operating History and Remediation Cost Under Uranium Mill Tailings Remedial Action Project as of 2000. <http://www.eia.doe.gov/cneaf/nuclear/page/untra/titleImap.html>

²² U.S. Nuclear Regulatory Commission, 2006. Fact Sheet on Uranium Mill Tailings. <http://www.nrc.gov/reading-rm/doc-collections/fact-sheets/mill-tailings.html>

²³ http://www.lm.doe.gov/pro_doc/references/framework.htm

²⁴ <http://www.oha.doe.gov/uran1.asp>

²⁵ Smythe, C., D. Bierley, and M. Bradshaw, 1995. The U.S. Regulatory Framework for Long-Term Management of Uranium Mill Tailings. International Conference on Radiation Protection and Radioactive Waste Management in the Mining and Minerals Industry. South Africa. February 20, 1995.

Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA, otherwise known as Superfund).²⁶ This law, passed in 1980, provided broad federal authority to respond directly to releases or threatened releases of hazardous substances that may endanger public health or the environment; it also established liability for releases of hazardous substances.²⁷ At abandoned mine and mill sites, the release of hazardous substances is typically a consequence of the processes used for extraction and separation of minerals or metals from the host rock. The most significant releases are typically associated with the fine-grained mill tailings and other waste generated from separation and chemical treatment at mill sites; however, waste rock (overburden), protore (low-grade ore), and unprocessed ore stockpiles can also be significant sources of hazardous substances at mine sites. The underground works of an abandoned mine can also generate a release of hazardous substances.²⁸

Given the above, and notwithstanding the absence of contemporary standards for mine closure and reclamation, the USEPA can require Kerr-McGee and its successors to undertake response actions (i.e., either short-term removal actions [reclamation] or long-term remedial actions) under CERCLA at any of the undisclosed Kerr-McGee mining-related sites at which hazardous substances were released if Kerr-McGee owned and/or operated those sites. For example, in a 2002 USEPA Unilateral Administrative Order for the White King/Lucky Lass Mines Superfund Site near Lakeview, Oregon (see **Section 4.5.1**), USEPA stated that:

1. "Hazardous substances," as defined in Section 101(14) of CERCLA, are present at the site and have been released into the soil, groundwater, surface water, and air;
2. The past disposal of hazardous substances from the site constitutes a "release," as defined in Section 101(22) of CERCLA, and the potential for future migration of hazardous substances from the site poses a threat of an additional release;
3. The release of one or more hazardous substances from the site may present an imminent and substantial endangerment to the public health or welfare, or to the environment;

²⁶ DeGraff, J.V., 2007. "Addressing the toxic legacy of abandoned mines on public land in the western United States," in DeGraff, J.V. ed., *Understanding and Responding to Hazardous Substances at Mine Sites in the Western United States: Geological Society of America Reviews in Engineering Geology*, vol. XVII.

²⁷ <http://www.epa.gov/superfund/policy/cercla.htm>

²⁸ DeGraff, J.V., 2007. "Addressing the toxic legacy of abandoned mines on public land in the western United States," in DeGraff, J.V. ed., *Understanding and Responding to Hazardous Substances at Mine Sites in the Western United States: Geological Society of America Reviews in Engineering Geology*, vol. XVII.

4. Kerr-McGee, through a series of corporate mergers, has assumed the liability of Lakeview Mining Company, which was an operator of the mine at the time of the release of hazardous substances; and
5. Kerr-McGee is therefore liable under CERCLA as a former operator of the mine, in accordance with Section 107(a)(2) of CERCLA.²⁹

Although Kerr-McGee has not formally acknowledged CERCLA liability at the White King/Lucky Lass Mines Superfund Site or that the release or threatened release of hazardous substances at or from the site constitutes an imminent or substantial endangerment to the public health or welfare or the environment, it has borne a significant portion of the cost expended thus far for investigation and remediation of the site through its agreement to a 1995 Administrative Order on Consent and a 2005 Consent Decree regarding the site.³⁰

Another example of a site where Kerr-McGee was requested to perform response actions under CERCLA is the Mansfield Canyon Mines Site, located near Patagonia, Arizona, which exhibits environmental impacts (primarily acid drainage) associated with historical mining activities dating to the 1800s and early 1900s (see **Section 5.4.8**). What is noteworthy about this site is that Kerr-McGee did not perform any actual mining at the site; rather, it held mining claims and performed mineral exploration (including drilling) at the site in the 1970s and 1980s. Nevertheless, Kerr-McGee was identified as a PRP for this site (as “owner or operator”) because it held mining claims at the site and was requested to perform response actions at the site.^{31,32}

Estimating the Present Value of Response Action Costs for Undisclosed Mining-Related Sites

Roux Associates used site-specific information that was known or knowable as of November 2005 to develop estimates of the present value of response action costs for the 12 sites discussed in **Sections 5.4.1** through **5.4.12**. As shown in the chart that follows, Kerr-McGee was named as a PRP at several of these sites and/or received requests for information pursuant to Section 104 of CERCLA as of November 2005. For most of these sites, site-specific cost

²⁹ U.S. Environmental Protection Agency, 2002. Unilateral Administrative Order for Remedial Design & Action. November 29, 2002.

³⁰ Consent Decree, Civil Action No.04-CV-00032, entered into by the United States of America, Kerr-McGee, Western Nuclear, and Fremont Lumber Company and signed by Kerr-McGee on August 31, 2005.

³¹ USFS to Kerr-McGee, *Facsimile*, February 14, 1996.

³² USFS, 1996. Letter from C.W. Cartwright, Jr. to R. Sanchez, Kerr-McGee Chemical Corporation re: Mansfield Canyon Mine Sites, Nogales Ranger District, Coronado National Forest. July 2, 1996.

estimates for removal actions (e.g., EE/CAs) had been developed as of November 2005 and served as the basis for Roux Associates' estimates of the present value of response action costs for these sites. At other sites, impacts to the environment had been documented as of November 2005 or it was known that historical mine features (often including waste rock piles) were present, but remedial action costs had not yet been estimated. For these sites, Roux Associates based its estimates of the present value on the cost elements for sites with similar settings, characteristics, and circumstances and/or used RACERTM to develop cost elements based on available site-specific information. For the vast majority (656) of the undisclosed mining-related sites, however, costs for necessary and appropriate environmental response actions were not estimated because site-specific information with which to develop cost elements was lacking and Roux Associates did not have sufficient time to conduct site inspections at these sites to determine whether or not historical mine features are present. These sites are briefly discussed in **Section 5.4.13**.

The table that follows lists the 12 sites for which sufficient site-specific information was identified to develop estimates of the present value for future response actions, along with other pertinent information.

Section	Site	Project Documents Indicate Kerr-McGee Identified as PRP	Project Documents Indicate CERCLA 104 Request for Information Sent to Kerr-McGee	Project Documents Indicate Known Environmental Impact	Historical Mine Features Identified in Project Documents
5.4.1	Lukachukai			X	X
5.4.2	Juniper Mine	X ¹	X	X	X
5.4.3	Flat Top Mine				X
5.4.4	CSMRI Table Mountain	X ²		X	X
5.4.5	Griffin Burning Station	X ³		X	X
5.4.6	Caselton Mine and Mill		X	X	X
5.4.7	Bristol Mine				X
5.4.8	Mansfield Canyon	X ⁴	X	X	X
5.4.9	Red Mountain, Colorado			X	X
5.4.10	Red Mountain, Arizona		X	X	X
5.4.11	Banta Hill				X
5.4.12	Pinal County				X

Notes:

1. Kerr-McGee was listed as a PRP for this site in a September 16, 2002 letter from the USDA to Morrison & Foerster, counsel for Kerr-McGee. See **Section 5.4.2**.
2. The current property owner (Amax Research & Development, Inc.) and its parent company (Cyprus Amax Minerals Company) have alleged that Kerr-McGee is a PRP for this site pursuant to CERCLA. See **Section 5.4.4**.
3. This site was formerly a listed UMTRCA site, and Kerr-McGee is named as the former operator of the facility in USDOE reports for this site. See **Section 5.4.5**.
4. Kerr-McGee was listed as a PRP for this site in July 2, 1996 letter from the USFS to Kerr-McGee. See **Section 5.4.8**.

Definitions for Selected Mining Terms Used in Section 5.4

The following definitions for selected mining terms used throughout **Section 5.4** are provided for reference. All are based on the BLM's publication "*Mining Claims and Sites on Federal Lands*" (2008 online version)³³ unless otherwise indicated.

1. **Unpatented mining claim** – a parcel of federal land, valuable for a specific mineral deposit or deposits, for which a claimant has asserted a right of possession for the development and extraction of a mineral deposit.
2. **Patented mining claim** – a mining claim for which the federal government has conveyed title to the claimant, making it private land.

³³ http://www.blm.gov/pgdata/etc/medialib/blm/wo/MINERALS_REALTY_AND_RESOURCE_PROTECTION/_energy.Par.28664.File.dat/MiningClaims.pdf

3. **Lode claim** – a claim (patented or unpatented) covering mineral veins or lodes having well-defined boundaries and other in-place rock bearing valuable mineral deposits, as opposed to a placer claim for mineral-bearing sand and gravel or non-metallic layered deposits.
4. **Millsite claim** – a claim for a millsite to support one or more lode or placer mining claim operations.
5. **To “stake” or “locate” a claim** – to distinctly and clearly mark claim boundaries such that they are readily identifiable on the ground, typically by erecting corner monuments and posting a notice of location in a conspicuous place, usually the point of discovery.
6. **To record a claim** – to file notice of a claim with the BLM and local county recording office.
7. **To validate a claim** – to document the presence of a valuable mineral deposit on the claim.
8. **To maintain a claim (pre-1993)** – to perform minimum annual assessment work (labor that is performed to develop a claim for production) or to make improvements to a claim.
9. **Adit** – a horizontal passage from the surface into a mine (commonly called a “tunnel”).³⁴
10. **Tailings** – those portions of washed or milled ore that are regarded as too poor to be treated further, as opposed to the concentrates, or material of value;³⁵ note, in its broadest sense, “tailings” may comprise all mining residues including unprocessed waste rock.
11. **Waste Rock** – Valueless rock that must be removed or set aside in order to gain access to and excavate the ore.³⁶

³⁴ Bates, R.L. and J.A. Jackson, eds., 1984. *Dictionary of Geological Terms*, third edition. Anchor Press/Doubleday, Garden City, New York

³⁵ Bates, R.L. and J.A. Jackson, eds., 1984. *Dictionary of Geological Terms*, third edition. Anchor Press/Doubleday, Garden City, New York

³⁶ Bates, R.L. and J.A. Jackson, eds., 1984. *Dictionary of Geological Terms*, third edition. Anchor Press/Doubleday, Garden City, New York.